What I claim as my invention is:

1. An improved method for reducing the fluid-dynamic base drag of a bluff body, having a substantially flat base surface, substantially normal to the longitudinal centerline of said bluff body, which comprises;

using a plurality of vortex generators mounted in a cross stream array on the side, top, and bottom surfaces of said bluff body, ahead of the trailing edges of said bluff body, to generate an array of counter rotating streamwise vortices in the passing boundary layer fluid,

and using said vortex generators in combination with a trailing panel mounted substantially parallel to the base surface of the bluff body, and at a predetermined distance from said base surface, and with the edges of said trailing panel inset a predetermined distance from the trailing edges of the bluff body,

thereby providing greater fluid-dynamic base drag reduction than either of the two component methods when used alone, and reducing the optimum mounting distance of said trailing panel for maximum base drag reduction to less than one third the preferred mounting distance for maximum base drag reduction when said trailing panel is used without said vortex generators.

2. A device or apparatus for reducing the fluid-dynamic base drag of a bluff body having a substantially flat base surfaces, substantially normal to the longitudinal centerline of said bluff body, which comprises;

a plurality of vortex generators mounted in a cross stream array on the side, top, and bottom surfaces of said bluff body, ahead of said trailing edges of said bluff body,

and combined with a trailing panel of predetermined size, mounted substantially parallel to the base surface of said bluff body and at a predetermined distance from said base surface of said bluff body,

whereby the combined device provides greater fluid-dynamic base drag reduction than either of the two component devices when used alone, and reduces the optimum mounting distance of said trailing panel to less than one third the required mounting distance for maximum base drag reduction when said trailing panel is used without said vortex generators.

3. The device of claim 2 wherein the bluff body is a land vehicle, and said vortex generators are omitted from the bottom surface of said land vehicle.

4. The device of claim 2 wherein the vortex generators are V shaped low drag vortex generators.

5. An improved method for reducing the fluid-dynamic base drag of a bluff body, having a substantially flat base surface, substantially normal to the longitudinal centerline of said bluff body, which comprises;

using a plurality of vortex generators mounted in a cross stream array on the side, top, and bottom surfaces of said bluff body, ahead of the trailing edges of said bluff body, to generate an array of counter rotating streamwise vortices in the passing boundary layer fluid,

and using said vortex generators in combination with a set of three or more shortened boattail plates of predetermined length, mounted substantially perpendicular to the base surface of the bluff body, and adjacent to and inset a predetermined distance from said trailing edges of said bluff body,

thereby providing greater fluid-dynamic base drag reduction than either of the two component methods when used alone, and reducing the optimum length of said shortened boattail plates for maximum base drag reduction to less than half the length required for maximum base drag reduction when full length boattail plates are used without said vortex generators.

6. A device or apparatus for reducing the fluid-dynamic base drag of a bluff body having a substantially flat base surfaces, substantially normal to the longitudinal centerline of said bluff body, which comprises;

a plurality of vortex generators mounted in a cross stream array on the side, top, and bottom surfaces of said bluff body, ahead of said trailing edges of said bluff body,

and combined with a set of three or more shortened boattail plates of predetermined length, mounted substantially perpendicular to the base surface of the bluff body and inset a predetermined distance from the trailing edges of the bluff body, so that the rear edge of each of said shortened boattail plates intercepts the separated shear surfaces at the perimeter of the low pressure wake,

whereby the combined device provides greater fluid-dynamic base drag reduction than either of the two component devices when used alone, and where the optimum length for said shortened boattail plates is reduced to less than half the length required for maximum base drag reduction when full length boattail plates are used without said vortex generators.

7. The device of claim 6 wherein the bluff body is a land vehicle, and said vortex generators are omitted from the bottom surface of the vehicle, and the bottom boattail plate is also omitted.

8. The device of claim 6 wherein the vortex generators are V shaped low drag vortex generators.

9. The device of claim 7 wherein the highway vehicle includes a truck body with one or more swinging rear doors, or a rollup rear door.

10. The device of claim 6 wherein two or more sets of shortened boattail plates are mounted in tandem, with each set of said shortened boattail plates being of a predetermined length, and inset at a predetermined distance from the trailing edges of the bluff body, so that the rear edges of each set of said shortened boattail plates intercept the separated shear surfaces at the perimeter of the low pressure wake, to further reduce base drag.

11. The device of claim 6 wherein one or more sets of said shortened boattail plates is enclosed to form a box shape having substantially the same predetermined dimensions and mounting positions of said shortened boattail plates.

12. The device of claim 6 wherein the shape of one or more sets of said shortened boattail plates is built into the rear body shape of said bluff body, and having substantially the same predetermined dimensions and mounting positions of said shortened boattail plates.

13. The device of claim 6 wherein the cross sectional shape of the base surface of a bluff body is other than a rectangle, and said shortened boattail plates are made in the shape of the perimeter of said base surface but at a smaller size, while maintaining the same predetermined inset distance from the edges of said bluff body, and the same predetermined length for said shortened boattail plates, relative to the direction of travel, so that the rear edge of each of said shortened boattail plates intercepts the separated shear surfaces at the perimeter of the low pressure wake.

14. The device of claim 6 wherein the leading edges of said shortened boattail plates are attached to a flat surface placed normal to the centerline of said bluff body, which serves as a temporary or substitute base surface for the bluff body, to form a removable boattail plate assembly that can be temporarily attached on the base surface of said bluff body, by straps or other suitable attaching means.

15. The device of claim 6 wherein a separate box or container having the required size and shape of said shortened boattail plates, is attached by straps or other suitable attaching means to said base surface of said bluff body, to function as a temporary boattail plate assembly.

16. The device of claim 6 wherein said device is used to reduce the base drag of a backstep.

17. The device of claim 6 wherein said device is used to reduce the hydrodynamic base drag of a watercraft having a displacement hull.

18. The device of claim 6 wherein said device is used to reduce the aerodynamic base drag of a railway vehicle.